

-- Figure 3A is an enlarged partial cross-section of the prior art assembly depicted in Figure 1;

Figure 3B is a partial cross-section of a second embodiment of the present invention having a straight bore seal;

On page 5, beginning at line 9, delete "FIG. 3 juxtaposes" and insert therefor -- FIGS. 3A and 3B show --.

In the Claims:

Please amend the claims as follows:

Sub 1 ~~1(Fourth Amendment). In combination with a swivel joint forming a~~
flow passage and having a central axis, the improvement comprising:

42 a hollow tubular male connector having a first end, an annular outer surface and a plurality of outer annular grooves formed on said outer surface concentric with said central axis, wherein each said outer groove comprises a generally arcuate cross-section and a radius measured from said central axis, and wherein the radius of each said outer groove is greater than the radius of each adjacent outer groove closer to said first end;

a hollow tubular female connector having an annular recess adapted to receive and fit around said outer surface and a plurality of inner annular grooves formed on said annular recess concentric with said central axis, said recess forming a shoulder within said female connector adjacent said first end, wherein each said inner groove comprises a generally arcuate cross-section and a radius measured from said central axis, and wherein the radius of each said inner groove is greater than the radius of each adjacent inner groove

Sub G1

closer to said shoulder, said inner grooves each corresponding to one of said outer grooves and forming therewith an arcuate race; [and]

a plurality of ball bearings received in each race to facilitate relative rotation of said male and female connectors about said central axis;

said first end of said male connector having a recessed inner annular portion;

said female connector having a recessed inner annular portion adjacent to said male connector recessed inner annular portion when said male connector is received in said female connector, such that said inner annular portions of said male and female connectors together form an inner annular seal groove; and

an annular seal having an outer sealing surface received in said seal bore thereby sealing against the inner circumferential surfaces of said inner portions of said male and female connectors, said seal having an inner surface generally flush with said flow passage.

Please cancel claim 3, without prejudice.

In claim 4, line 1, after "claim" delete "3" and insert therefor -- 1 --.

Sub G4

19 (Twice Amended). A swivel joint comprising:

a central axis;

a hollow tubular male connector having an outer annular surface, a first end and at least first and second outer annular grooves formed on the outer surface concentric with the central axis;

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a hollow tubular female connector having an inner annular recess forming an inner annular shoulder and at least first and second inner annular grooves formed on the inner recess concentric with the central axis;

wherein the inner recess is adapted to receive and overlap the outer surface such that the first end is adjacent the inner annular shoulder and each inner groove is in alignment with a corresponding outer groove to thereby define at least first and second arcuate races;

wherein the diameter of each arcuate race is greater than the diameter of each adjacent arcuate race closer to the first end of the male connector; [and]

a plurality of ball bearings received in each race to facilitate relative rotation of the male and female connectors about the central axis;

a first recessed section adjacent the first end and a second recessed section adjacent the inner annular groove, the first and second recessed sections forming a recessed groove when the male connector is received in the female connector; and

an annular seal positioned within the recessed groove;

wherein the male and female connectors form a flow passage of the swivel joint.

1,429 (Twice Amended).

A swivel joint comprising:

a central axis;

a hollow tubular male connector having an annular outer surface and a first end;